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which a vibrating pendulum can give motion to wheel work, he may communicate it: as it is much wished that an instrument may be made, which by the motion of an index hand and dial plate, may show the number of vibrations in a given time, caused by the electric column.

Of extracting a liquid Sugar from Apples and Pears, by Mr Dubuc, manufacturing Chemist at Rouen.

Annales de Chemie.

The high price of Sugar on the continent has induced Prous, Parmentier, Cadet de Vaux, and other chemists, to investigate methods of obtaining it from various substances, and they have published processes more complicated, for obtaining it from grapes, apples and pears.

Several establishments having been formed in the south of France for making sugar from grapes, M. Dubuc wished that its northern extremity should have a similar advantage, and the excellent preserve, which has been made of apples and pears in that country for time immemorial, convinced him that the sugar prepared from them would be equal in quality, to that procured from grapes, and induced him to make experiments on them for that purpose.

First Experiment.

Eight *litres* or quarts, of the juice of very ripe apples, called *d'Orange*, were boiled in a copper bason, or boiler, for about a quarter of an hour, and then ten drachms or grammes of finely powdered chalk, were added to it, in four separate portions, two minutes after each other, in order to neutralize the acid in the juice: this substance occasioned a fermentation or effervescence in the juice. The boiling was then continued for eight or ten minutes, and the juice was kept stirred, in order to multiply the points of contact between it and the chalk: after this it was clarified in the following manner.

Three whites of eggs were beat up in three glasses of cold water, and whipped with a willow whisk, when the whites were well frothed, they were added at once to the juice, and well mixed by stirring it quickly with the same whisk; it was then left to boil for another quarter of an hour. The white of egg coagulates by being boiled, and collects all the impurities of the juice. After this the juice was strained through a flannel strainer supported at the four corners on a wooden frame.

It was then left to grow half cold, and again strained, in order to have it very clear and well clarified.

The juice only lost about one-third of its weight during these operations, what remained was reduced by boiling slowly, to about one half of its original bulk; the process was then finished without boiling until the syrup took, when cooled, a consistence like that of common treacle.

It may also be known to be properly prepared by a thick skin that may be observed at the surface of the liquid, or even by its specific gravity compared with that of water. A vessel which contains a quart, or two pounds of water, old French measure, ought to contain 2lb. 10 or 11 oz. of syrop, or liquid sugar. This last method is the best and most certain.

The above eight quarts of juice yielded near three pounds of liquid sugar, savoury, fresh, and which sweetens water very well, or even milk without curdling it (which the addition of the chalk prevents by neutralizing the acid, which would have this effect) so that it would be an advantageous substitute for treacle or sugar.

M. Dubuc gives an account of thirteen other experiments, which he made to obtain sugar from various species of apples and pears, of which our limits will not permit the recitation, the processes used in them did not however vary materially from that related, and the chief facts observed in them are contained in the following recapitulation of the experiments, inserted at the end of M. Dubuc paper.

Recapitulation.

1. Of the four ripe kinds of apples, which were used, it was found that the *orange* produced the most sugar, then came *Doux-levesque*, after them the *blanc mollet*, and lastly the *Girard.*
2. That a mixture of these four

species of fruits yielded an agreeable syrup, or sugar, in a certain proportion to the quantity employed.

That apples or pears, which have not thoroughly ripened, are not so good for making sugar, and they yield less of it, and of an inferior quality, than when they are ripe.

4. That sugar may be obtained from the pears called *Pillage*, but it is of an inferior quality and in less quantity than that from apples, supposing the two fruits taken in equal measure.

5. That apples, which are not thoroughly ripe should be well bruised, and then be left for 24 hours, in order that the saccharine principle may be developed by the incipient fermentation; they yielded by this method more sugar, and that of better quality.

6. These principles are equally applicable to pears..

7. That in order to procure apple sugar, which does not curdle milk, it is absolutely necessary to neutralize the acid; and that it requires 'bout a drachm (troy) of chalk powder for every quart of juice, and two drachms to absorb the same quantity of acid contained in pear juice, which shows that the latter juice contains more acid than the former.

8. That it is impossible to obtain apple juice, or pear juice sufficiently clear to make a clear well tasted syrup, without using some intermedium for its clarification; and that either whites of eggs, or charcoal (finely powdered) may be employed for that purpose.

9. That in order to obtain liquid sugar of good quality from apples and pears, the heat must be applied gently and carefully, observing in all points what has been remarked in the first and following experiments, and especially it must be recollected, that the syrup becomes brown towards the the end of the operation, and tastes of burned sugar, if it be too much heated.

10. That according to the fifth experiment and those that follow, a cwt. of apples yield nearly eighty-four pounds of juice; which juice being reduced to a syrup by the above processes, yields nearly twelve pounds of liquid sugar. So that from these data it follows, that upon a medium of several years the price of apples being 1.20 francs (1s. 1d.) the cwt. and calculating the charges of making the sugar at 0 40 franc (4d.) excellent sugar may be obtained for 3 or 4 sols (2d.) per lb.

In a note on the first experiment, it is observed, that as yet only a very small quantity of solid sugar has been obtained from apple-juice. Nearly twenty specimens have, however, been obtained, upon which experiments have just been made, in order to obtain, if possible, a larger quantity. And from this note it appears, that wherever sugar is mentioned in the above paper, liquid sugar or syrup must be understood.

Composition for Roofs; communicated by James Ferguson, esq. of Pitfour, who received it from Commissioner Graham, of the Excise-office, Edinburgh.

From communications to the Board of Agriculture.

1st. Three parts of chalk, pounded fine, and passed through a sieve of twenty four meshes to an inch, are to be put into a small wooden box or vessel. 2d Into the middle of the chalk put one part of the best vegetable tar (Swedish will not do); mix them thoroughly with a wooden shovel, the tar to be poured in gradually; when completely mixed put it into an iron boiler, which must be moderately and gradually heated, stirring the composition to keep it from burning; after it has boiled for some time, dip in a lath, which is to be immediately cooled in water; if the composition on the lath is hard enough to resist the end of the finger, but yields to the nail, then it is ready to take the sand, which is to be prepared as follows:—Take the sharpest sand to be got, wash it if necessary, quite free from earth, and when dry pass it through a sieve of eight meshes to an inch; what passes is to be again sifted through one of sixteen meshes; that which does not pass is the coarse, or No. 1; sift again that which passed through sixteen, through one of thirty, and reject all the fine dust